

## Abstract

A multiplex optical communication system transmitting a multiplex optical signal between terminal equipments each including converters producing optical signals  
5 combined to the multiplex optical signal, through repeater equipment including an optical amplifier, under controlling the amplifier so that when a converter is added or removed, a time constant of the amplifier is equal to a time constant of the added or removed converter, or the amplifier produces output under constant output level control before adding or removing the converter and after the amplifier produces final output and  
10 constant gain control during the added or removed converter increases or decreases output. The time constant control is performed to the amplifier by making the amplifier repeat start and stop of increasing or decreasing output step by step in accordance with prescribed objective values corresponding to half way output of the optical amplifier.